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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,679	06/30/2004	Shuichi Ohkubo	17937	6540

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EXAMINER	
GIESY, ADAM	
ART UNIT	**PAPER NUMBER**
2627	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
2 MONTHS	03/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,679	OHKUBO, SHUICHI	
	Examiner	Art Unit	
	Adam R. Giesy	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2005*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-10,12-14 and 16-23* is/are pending in the application.

4a) Of the above claim(s) *7-10,14,16,20 and 23* is/are withdrawn from consideration.

5)☒ Claim(s) *1,3-6,12,13,17-19,21 and 22* is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Objections

1. Claims 7-10, 14, 16, 20, and 23 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

2. Claims 1, 3-6, 17, and 18 are objected to because of the following informalities:

In claims 1, 3-6, 17, and 18, Examiner asserts that the square brackets "[" and "]" are used to denote material to be deleted from a claim or specification during an amendment. Examiner suggests that all square brackets "[" and "]" be replaced by parenthesis "(" and ")" or curly brackets "{" and "}".

Appropriate correction is required.

Allowable Subject Matter

3. The following is an examiner's statement of reasons for allowance:

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Claims 1, 3-6, 17, and 18 are allowed over the prior art of record.

Independent claims 1 and 17 are allowed since the claims recite a method and apparatus (respectively) for adjusting a recording condition of optical information, comprising the steps of: irradiating an optical recording medium with laser light having a recording pulse waveform generated based on a recording signal, which is in synchrony

with clock cycles, to form a record mark group on said optical recording medium; reading said record mark group to obtain a reproduced waveform, and adjusting the recording condition by sampling said reproduced waveform at a period shorter than a clock period to evaluate a linearity of said reproduced waveform, wherein said adjusting step linearly interpolates sampled values of said sampled reproduced waveform at a timing of R1 or R2 assuming a maximum, to extract times-series data of said reproduced waveform for respective clock cycles, given R1 and R2 being expressed by the following formula:

$$R1 = (n+1)x\frac{\sum_i h_i^2}{\sum_k (y_k - \sum_i a_{k-1} x h_i)^2} \quad \text{and}$$

$$R2 = \frac{\sum_k y_k^2}{\sum_k (y_k - \sum_i a_{k-1} x h_i)^2}$$

(i being an integer satisfying $0 \leq i \leq m$) respectively, wherein $[a_0, a_1, \ldots, a_k, \ldots, a_{n-1}, a_n]$ represent said time-series data for respective said clock cycles of the clock for recording said optical recording medium, $[y_0, y_1, \ldots, y_k, \ldots, y_{n-1}, y_n]$ represent time-series data of said reproducing waveform for respective said clock cycles (n being an integer not smaller than zero, and k being an integer satisfying $0 \leq k \leq n$), and $[y_0, y_1, \ldots, y_m]$ represent pulse responses of a recording/reproducing system corresponding to a specific recording/reproducing condition (m being an integer satisfying $0 \leq m \leq n$).

Claims 3, 18, 19, 21, and 22 are allowed as being dependent upon the aforementioned independent claims 1 and 17.

Independent claim 4 is allowed since the claim recites a method for adjusting a recording condition of optical information, comprising the steps of: irradiating an optical recording medium with laser light having a recording pulse waveform generated based on a recording signal, which is in synchrony with clock cycles, to form a record mark group on said optical recording medium; reading said record mark group to obtain a reproduced waveform, and adjusting a recording condition by evaluating a linearity of said reproduced waveform, characterized in that: said adjusting step is such that an index of the linearity is obtained by the following formula:

$$R1 = (n+1)x\frac{\sum_i h_i^2}{\sum_k (y_k - \sum_i a_{k-1} x h_i)^2}$$

(i being an integer satisfying $0 \leq i \leq m$) respectively, wherein $[a_0, a_1, \ldots, a_k, \ldots, a_{n-1}, a_n]$ represent said time-series data for respective said clock cycles of the clock for recording said optical recording medium, $[y_0, y_1, \ldots, y_k, \ldots, y_{n-1}, y_n]$ represent time-series data of said reproducing waveform for respective said clock cycles (n being an integer not smaller than zero, and k being an integer satisfying $0 \leq k \leq n$), and $[y_0, y_1, \ldots, y_m]$ represent pulse responses of a recording/reproducing system corresponding to a specific recording/reproducing condition (m being an integer satisfying $15 \leq m \leq n$).

Claims 6 and 12 are allowed as being dependent upon the aforementioned independent claim 4.

Independent claim 5 is allowed since the claim recites a method for adjusting a recording condition of optical information, comprising the steps of: irradiating an optical recording medium with laser light having a recording pulse waveform generated based

on a recording signal, which is in synchrony with clock cycles, to form a record mark group on said optical recording medium; reading said record mark group to obtain a reproduced waveform, and adjusting the recording condition by evaluating a linearity of said reproduced waveform, characterized in that:
said adjusting step is such that an index of the linearity is obtained by the following formula:

$$R2 = \frac{\sum_k y_k^{\,2}}{\sum_k (y_k - \sum_i a_{k-1} x h_i)^2}$$

(i being an integer satisfying $0 \leq i \leq m$) respectively, wherein $[a_0, a_1, \ldots, a_k, \ldots, a_{n-1}, a_n]$ represent said time-series data for respective said clock cycles of the clock for recording said optical recording medium, $[y_0, y_1, \ldots, y_k, \ldots, y_{n-1}, y_n]$ represent time-series data of said reproducing waveform for respective said clock cycles (n being an integer not smaller than zero, and k being an integer satisfying $0 \leq k \leq n$), and $[y_0, y_1, \ldots, y_m]$ represent pulse responses of a recording/reproducing system corresponding to a specific recording/reproducing condition (m being an integer satisfying $15 \leq m \leq n$).

Claims 6 and 13 are allowed as being dependent upon the aforementioned independent claim 5.

The closest prior art by Takeuchi et al. (US Pat. No. 7,126,897 B2) discloses a multi-level recording apparatus for adjusting the recording methods in order to improve recording conditions wherein the device will sample a reproduced waveform and perform a waveform equalizing procedure, then adjust the timing of the recording signal based on the sampling of reproduced waveform. Takeuchi does not disclose that an

adjusting step linearly interpolates sampled values of said sampled reproduced waveform at a timing of R1 or R2 assuming a maximum, to extract times-series data of said reproduced waveform for respective clock cycles, given R1 and R2 being expressed by the following formula:

$$R1 = (n+1)x\frac{\sum_i h_i^2}{\sum_k (y_k - \sum_i a_{k-1}xh_i)^2} \quad \text{and}$$

$$R2 = \frac{\sum_k y_k^2}{\sum_k (y_k - \sum_i a_{k-1}xh_i)^2}$$

(i being an integer satisfying $0 \leq i \leq m$) respectively, wherein $[a_0, a_1, \ldots, a_k, \ldots, a_{n-1}, a_n]$ represent said time-series data for respective said clock cycles of the clock for recording said optical recording medium, $[y_0, y_1, \ldots, y_k, \ldots, y_{n-1}, y_n]$ represent time-series data of said reproducing waveform for respective said clock cycles (n being an integer not smaller than zero, and k being an integer satisfying $0 \leq k \leq n$), and $[y_0, y_1, \ldots, y_m]$ represent pulse responses of a recording/reproducing system corresponding to a specific recording/reproducing condition (m being an integer satisfying $0 \leq m \leq n$).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Udagawa (US Pat. No. 7,113,468 B2) discloses a method of adjusting recording conditions wherein a waveform is sampled at various points in order to determine the adjustments.

b. Sasaki et al. (US Pat. No. 7,088,663 B2) discloses a method of adjusting recording conditions wherein a waveform is sampled at various points in order to determine the adjustments.

c. Minamino et al. (US Pat. No. 6,757,239 B2) discloses a method of adjusting recording conditions wherein a waveform is sampled at various points in order to determine the adjustments.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam R. Giesy whose telephone number is (571) 272-7555. The examiner can normally be reached on 8:00am- 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William R. Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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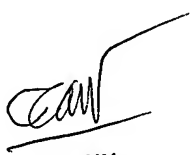

TAN DINH
PRIMARY EXAMINER
3/19/07